Cardio-thoracic surgery: a pain in the neck—metaphorically and literally

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Published online: 3 February 2021

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“Ergonomists have long recognized the potential hazards facing the surgeon; from the ergonomic stand point, surgery has been described as a mess” [1]. Matters assume more serious proportions for a cardio-thoracic surgeon.

With a deep seated, and a relatively fixed heart and lacking the luxury of large myocardial incisions to expose intracardiac structures, the surgeons are forced to croon into bad, in-organic and un-physiological postures during most surgeries of the heart. The scenario does not change much, even for the surgeries of aorta, lungs and oesophagus. Partly, these unnatural postures are mandated by the needs of the surgery, but equally, these are as a result of bad ergonomic practices inculcated in childhood. The problem gets further accentuated with the recent flip to minimally invasive cardio-thoracic surgeries, especially if performed sans any assisted visualisation. All this leads to chronic backaches and shoulder or neck pains, which are ubiquitous and a bane for any ageing cardio-thoracic surgeon.

These intuitive observations have been given scientific flair and objectivity by a recent study involving 53 surgeons from 12 different surgical specialities, who were observed performing 115 different operations [1]. Andrew Meltzer et al. used wearable sensors, called inertial measurement units (IMUs), to study the ergonomics of surgeons during various surgeries and identify risk factors for injury. ‘The IMU sensors measure body-posture angles via the fusion of data from an accelerometer, magnetometer and gyroscope contained within each sensor’ [1]. The authors divided high-risk positions into four categories and specifically looked at the time spent by the surgeon in each position. ‘This high-risk classification was based on occupational ergonomic research exposure-response analyses, which have shown clinically significant musculo-skeletal disorders and/or discomfort

associated with exposure to neck, torso and arm postures in the high risk categories’ [1].

Meltzer et al. found that the proportion of procedure time spent in high-risk positions was 65% for the neck, 30% for the torso and 11% for the shoulders. When one used the surgical loupes, neck was in an abnormal position during 85.2% of the procedure time, as compared with 58.1%, when loupes were not used ($p=0.007$). The corresponding figures with use of head lamps were 79.9% versus 62.2% sans head lamps ($p=0.02$). The authors thus identified the use of surgical magnifying loupes and head lamps to be associated with increased time spent in ergonomically unfavourable neck positions. They even identified the risk factors for surgeon-reported body aches and pains, which were longer case length ($p < 0.001$), increased years in practice ($p=0.02$), use of magnifying loupes ($p=0.001$) and operating head lamps ($p=0.01$).

The physical demands of performing cardio-thoracic surgery are real. A surgeon’s cervical and upper thoracic spine, in particular, is at an elevated risk. The study thus highlights and sensitizes one to a virtually ubiquitous malady, confronting all cardio-thoracic surgeons, of chronic pain and disability associated with these long and demanding procedures. This is potentially career terminating and is not only devastating to the surgeon, but also has a larger connotation in terms of wasted human resources for the humanity. The wearable technology, thus, can be used to study the specifics of intra-operative ergonomics involved in an individual surgeon, and for various types of procedures, with a view to improving the posture to prevent long-term disability. As the researchers themselves put it, ‘Hopefully, this research letter encourages further investigation and induces surgeons to be mindful of their intra-operative ergonomics’ [1].

This study from the Mayo clinic, though a small one with selection bias and published as a research letter, yet has consequences, which can be far reaching and certainly deserve more follow-up studies. Moreover, it exhorts surgeons to take cognisance of the state of their health, not sparing any arduous measures to preserve it and to keep healthy and ‘Fighting Fit’ (hic ‘Surgically Fit’)!

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Compliance with ethical standards

Conflict of interest The author declares that he has no conflict of interest.

Informed consent Not required.

Reference

1. Meltzer AJ, Hallbeck MS, Morrow MM, Lowndes BR, Davila VJ, Stone WM, Money SR. Measuring ergonomic risk in operating surgeons by using wearable technology. *JAMA Surg.* 2020;155:444–6.

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